Robotic Process Automation : Under Promise Over Deliver

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Abstract

Today, humanity is witnessing a transformational era in the history of mankind. Needless to say, the accelerationof change in technology is faster than ever before. Changes in technology in a year are more than what changed over decades earlier. Riding on technological advancements, customer expectations are going northward, and they are expecting more every day.Customers want quality service with reduced delivery time without spending more.

Manufacturers and service providers are searching for opportunities and betting big on technology to reduce costs and improve quality through reduction of defects. Automation had always been the tool to achieve this. Traditionally technology has focused on automation by mechanical robots. Robots have taken over entire shop-floor and warehouse tasks. Now robots are entering office space to perform routine mundane activities to execute business transactions. In common parlance, it is known as Software Robotic Process Automation (RPA). The article discusses about this transformation technology platform that is reshaping how corporations run business.

RPA has the potential to impact all aspects of business from customer facing functions to finance backroom operations, from purchasing to manufacturing operations, and from planning to data maintenance. RPA stands to greatly benefit many enterprises dealing with repetitive, rule-based activities performed by system users across IT platforms using structured and unstructured data. It leaves humans to focus more on value-adding activities that require judgement, speculation, and intelligence.

The use cases in this article are examples from real business applications which the authors are involved to a great extent, from feasibility and process study to implementation. For more information, they would be glad to be contacted.

Keywords: Artificial Intelligence, bot, digital workforce, Robotic Process Automation

I. INTRODUCTION

In an era of information technology, high supply and demand uncertainty, ever demanding and informed customers, continually increasing competition, diminishing geographical boundaries giving way to globalization, success of business often hinges on the organization's ability to embrace technology to showcase speed in response and delivery, attract and retain customers offering better customer satisfaction, reduce cost, and condense processing time. Robotic Process Automation (RPA) is one such cutting edge technology that provides an opportunity to organizations to automate certain business processes henceforth resulting in achievement of enhanced customer satisfaction and improved bottom-line.

As the organization unburdens the mundane and rule-based tasks to automation, the most important resource of theirs, their employees, focus more and more on valued-added and customer focused activities. This not only improves employee morale but also expands customer satisfaction. A lean organization tends to make less process errors.

With today's organizations becoming more and more service oriented, IT departments are getting resource intensive. Recognising and increasing RPA need and applications provides an effective tool to the business to be more competitive and agile.

II. UNDERSTANDING RPA - ORIGIN AND DEFINITION

Robotic Process Automation(RPA) is the first step in

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the automation continuum. It provides a platform to automate non-judgmental, rule-based transactions performed across IT systems. Most of the RPA platforms are technology agnostic. They provide seamless automation of tasks performed on disconnected systems. A process that starts with reading of email (Microsoft Outlook), capturing details from a spread sheet (Microsoft Excel), and updating a record in ERP system (Oracle, SAP, Infor) can be easily automated through RPA platforms. RPA is the first step in the automation journey of an organization. When coupled with predictive analytics tools and decision making, it can truly transcend actions taken by machines with superior decision-making abilities.

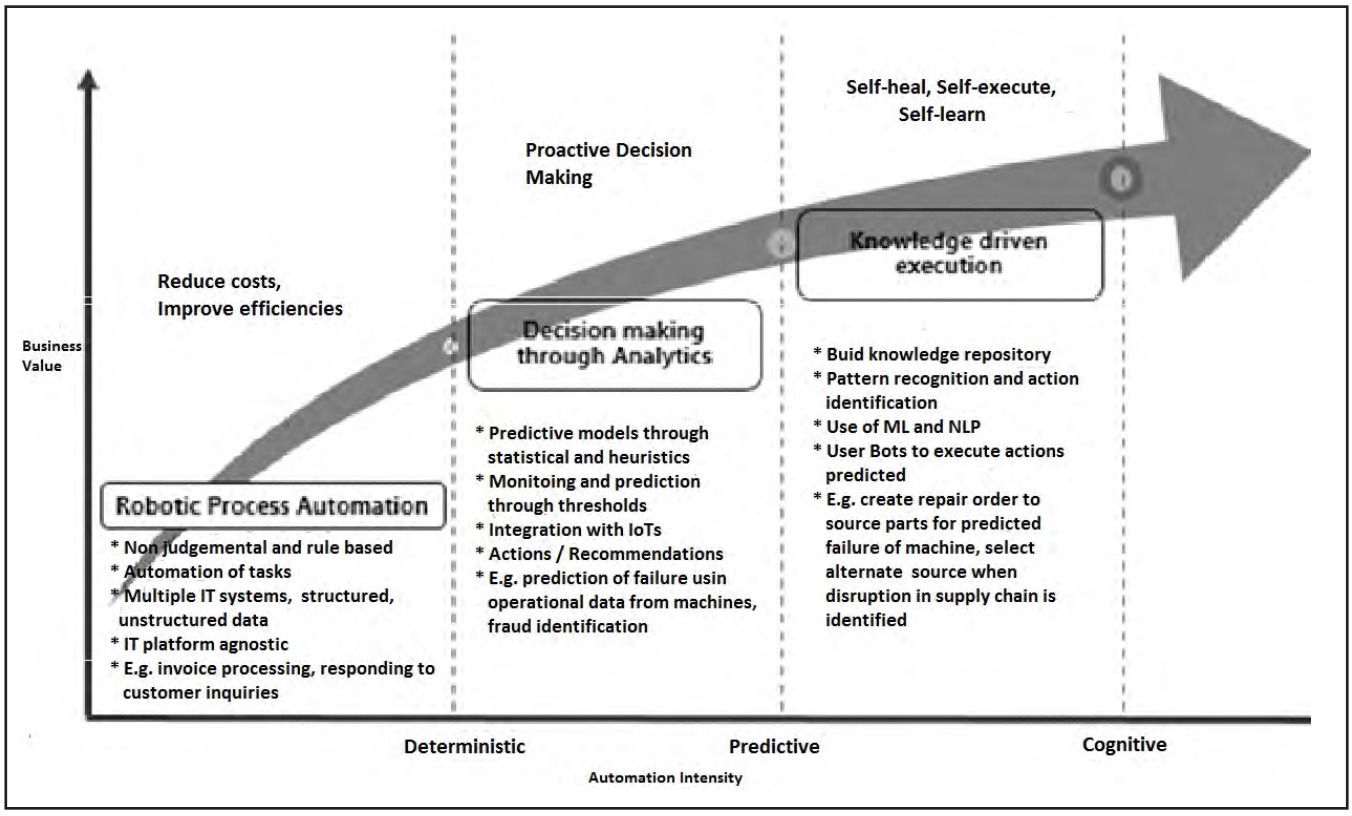

Fig.1. Automation Intensity

RPA is an emerging form of business process automation technology based on the notion of software robots or artificial intelligence workers [1].

Most technocrats give credit to Blue Prism as the pioneer in Robotic Process Automation. They coined the term 'robotic automation' in 2012.

In 2003, Blue Prism's first commercial product, 'Automate', was launched. In 2005, version 2 of Automate was released with features for large scale processing. Co-operative financial services began using Blue Prism software in 2005 to automate manual processes in customer services [2].

Upon breaking the phrase and define each term distinctly, we see that :

•**Robot** is a physical or virtual machine which can be programmed by a computer and is capable of doing complex tasks, and in terms of RPA this task is to mimic the human actions.

•**Process** is a sequence of steps that lead to a meaningful activity or task.

•**Automation** is any process or task that happens without any human intervention.

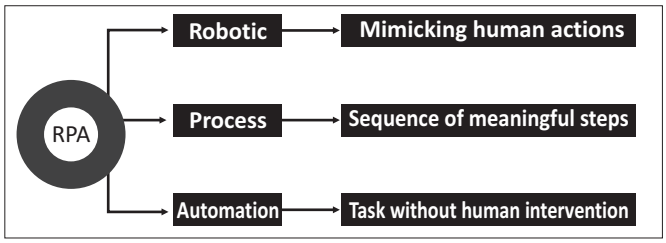

Fig. 2. Robotic Process Automation

Hence, **Robotic Process Automation** or **RPA** is

mimicking human action intelligently to perform a process without human intervention.

Also known as *Software Robot, Digital labor,and Digital Workforce*. People in the industry now simply call it Bot(s). These terms are interchangeably used in this article.

Contrary to conventional belief, today IT has a great scope of automation to reduce its labour intensive spheres. This is the area which can be effectively addressed by RPA.

Robotic Process Automation is based on the premise of 'Automation' of

a. transactional rules-based tasks
b. structured data
c. clear predefined rules

This is well suited for routine activities based on predefined rules with involvement of limited human judgement. When compared with other technologies such as Artificial Intelligence, Cognitive Intelligence, Deep Learning, Machine Learning, etc., RPA is very basic, valuable, and proven. The capability of this technology has already been demonstrated.

Types of Bots

There are three broad categories of bots:

• **Chatbots:** Most commonly used bots when it comes to simple, predefined, directed tasks like customer care services.

• **RPA bots:** Used to perform more intelligent tasks in a business environment such as data processing etc.

•**Digital assistants:** Used in smart devices and to some extent try to use artificial intelligence.

III. ROBOTIC PROCESS AUTOMATION TOOLS

There are currently more than 50 established RPA tools-provider in the market. As per Forrester Research firm, UiPath, Blue Prism, and Automation Anywhere are more popular and they are market leaders Robotic Process Automation tools providers.

A. UiPath

UiPath, founded in 2005 by the Romanian entrepreneurs Daniel Dines and Marius Tirca is a global software company that develops a platform for Robotic Process Automation. It offers a free community edition for individual developers, open source projects, and academic research [3].

UiPath is built upon the .Net framework. C and Vb net codes are used for developing custom activities and macro coding.

B. Blueprism

Blue Prism is the trading name of the Blue Prism Group, a UK multinational software corporation that pioneered and makes enterprise robotic process automation software to eliminate low-return, high-risk, manual data entry, and processing work [2].

Blue Prism is built on the Microsoft .NET Framework. It automates any application and supports any platform (mainframe, Windows, WPF, Java, web, etc.) presented in a variety of ways (terminal emulator, thick client, thin client, web browser, Citrix, and web services).

Blue Prism has been deployed in a number of industries including banking, finance, insurance, consumer package goods, legal services, public sector, professional services, healthcare, and utilities.

C. Automation Anywhere

The company's product, Automation Anywhere Enterprise caters to enterprises looking to deploy a digital workforce composed of software bots that complete business processes end-to-end. Automation Anywhere Enterprise combines traditional RPA with cognitive elements such as natural language processing and reading unstructured data.

With operations in over 10 countries, the software company develops products that adapt to robotic process automation technology in leading financial services, business process outsourcing, healthcare, technology, and insurance companies[4].

A few more top listed RPA tools provider are as follows:

Another Monday, WinAutomation, Pega, Kofax, Giant, Workfusion, Contextor, Jacada, Kryon, NICE Systems, Onvisource, OpenConnect, Redwood Software, AutomationEdge, Foxtrot, etc.

Most of the IT service providers like HP, TCS, IBM, Accenture, Cognizant, Deloitte, KPMG, etc. partner with one or more RPA tools.

Indian IT leader Infosys has its own automation platform called **Assist Edge**, which is quite popular with its customers and is already assisting many clients in several industries.

D. Assist Edge – An Infosys Automation Tool

Infosys Assist Edge is an automation platform used for automating non-judgemental and repetitive processes. This is a technology agnostic platform allowing automation of processes that span across multiple IT platforms. As an example, a process can start with receiving of email, then entering data in excel, then processing excel in Oracle ERP, then querying data from database, and finally sending notification emails to the desired set of people. Main features are as follows:

- Infosys AssistEdge is a technology agnostic platform that allows automation of process using multiple IT systems.
- AssistEdge can be used for remote automation execution or assisted automation (on demand) or a combination of both.
- AssistEdge robots are highly configurable providing much needed flexibility during deployment.

IV. APPLICATION OF BOTS

Bots find their applications in various business areas to varying extent. A few broad and important areas have been noted below:

1) Finance: Finance bots can perform financial activities such as automatically processing invoices upon arrival, perform posting, updating records, and sending notifications to required groups.

2) Customer Care: Call Center bots provide a superior customer experience because of its consistently non-tiring 24X7 service. Bots can quickly access multiple systems to fetch, study, or process relevant data.

3) Business Operations: These bots can perform repetitive, manual activities efficiently in considerably less time, and enable humans to focus on more value-added activities.

4) IT Services: IT Service bots perform common activities such as user id creation, password reset, monitor system performance, reply to specific queries etc.

5) Human Resource: HR bots find their applications in attendance and payroll processing, employee onboarding, off-boarding, leave processing and approval, claim processing etc.

6) Data Management: Bots can play a big role in big

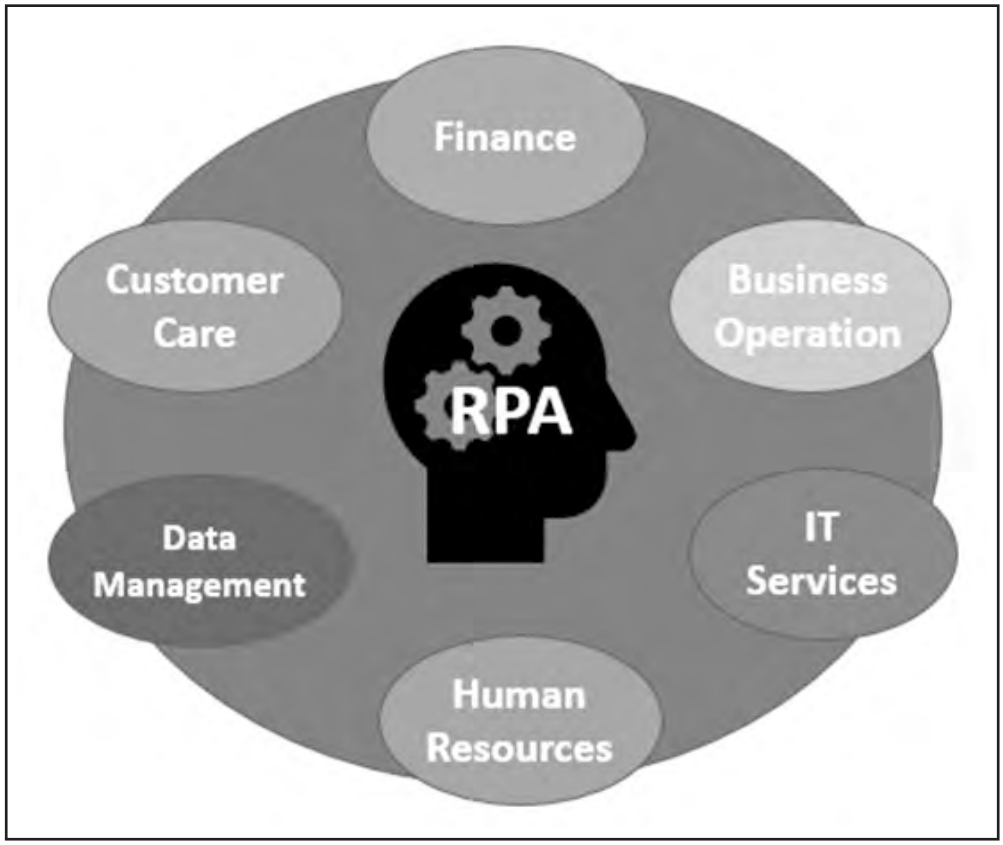

Fig. 3. Applications of RPA

data validation, data analysis, reporting etc. when volume is a concern with a lot of mechanical work.

V. USE CASES

All the use cases here mentioned have been built on Infosys AssistEdge. This is not an exhaustive list. Keeping broader target readers in mind, two common use cases have been cited in detail.

1. Item life cycle management in Oracle and SAP ERP system
2. Software support ticket handling system
3. Supplier and customer onboarding in ERP
4. Receivables, payables, and Invoice processing
5. Software component testing
6. Export compliance check during shipment
7. Customer care chatbots
8. Accounting period open and close
9. Master data maintenance
10. Automated and mass mail response

A. Case 1: Use of Bots in Invoice Processing

Business requirement: Mr. Rob is an accountant. Upon receiving an email, he has to open the attachment, log in to access data across multiple systems such as Oracle ERP system, Share point, etc., and then process invoices, process customer payments, update records, and send email notifications to multiple entities. He also needs to generate some reports, zip the report along with the excel file received earlier, and upload onto the share point.

This is a repetitive and monotonous work done by multiple accountants. The whole process takes around 10 minutes per invoice.

Action steps

Robotic Accountants or Accounting Bots are used to mimic the task of an accountant like Mr. Rob. Bots take around 2-3 minutes to complete the task.

- Software robot receives an email (in Mr. Rob's Outlook) to create an invoice
- Opens and logs into the ERP system
- Opens invoice and scans attachment
- Validates data by checking necessary data points
- Copies the data from the attachment and enters required data into the ERP system
- Sends email to the requestor to adjust invoice value in case of any discrepancies
- Creates invoice document
- Zips the files and upload onto the Sharepoint
- Sends email confirmation after completing the task
- Closes the forms and function
- Logs out of the system

B. Case 2: Use of Bots in Customer on Boarding

Business Requirement: Ms. Lucy is a CRM executive of a multinational company. She is the global lead in her department. She gets requests through emails to create customer details in the ERP system from all global sites. She has to create customers based on the details received in her email, then update records in a file on the Share point and revert to the requestor through email.

Action steps

Customer care bots are used to mimic the task of an executive like Ms. Lucy. Bots take around 2-3 minutes to complete the task as opposed to 7-8 minutes taken by human users.

- Software Robot receives an email (in Ms. Lucy's Outlook) to create a customer in the ERP system
- Opens and logs into the ERP system
- Opens the attachment from the email
- Validates data by checking necessary data points
- Copies the data from the attachment and enters required data into the ERP system
- Sends email to the requestor in case of any discrepancies
- Creates customer details in the system
- Runs a backend (SQL Developer) query to validate the records
- Updates the records in a file on the Share point
- Sends email confirmation after completing the task
- Closes the forms and functions
- Logs out of the system

Benefits

Post RPA, accuracy rate has been reported upto 99%. In both cases, another big advantage of automation is 20-30% reduction in processing time and effort of the employees. This helps them in utilizing their time in more effective and value-added tasks.

VI. ADVANTAGES OF RPA

RPA tools have many advantages which make them stand out among their existing technology counterparts.

1) Ease of implementation: The implementation process is fairly easy with no additional tasks involved. Also, it generally does not require intensive user training.

2) Quick utilization: Short time-to-market period. RPA implementation cycles are typically quite short, and in the range of 6 to 10 weeks as opposed to many other established softwares.

3) Non-disruptive and non-invasive: RPA technology works well across many heterogeneous systems without any real integration with existing systems. As an example, implementing RPA in an ERP environment does not require any hard integration with the ERP systems. It just requires some access to log into the system as a generic user to perform and mimic the user task.

4) Cost savings: Low investment and expenditure makes RPA more lucrative. Business can achieve lower operating expenses with a downsized workforce. Free up better and smart workers from cut-and-paste jobs and redeploy them in more complex and interesting tasks.

5) Return on investment: A visible return on investment (ROI) can be realized in as quickly as 8-12 weeks.

6) Higher accuracy and efficiency: RPA is more accurate in lesser time. BOTs are tireless 24X7 digital workforce. Technology is always less prone to making mistakes.

7) Scalability: This is scalable on demand and supports business agility.

8) Employee morale: Employees can be freed up from boring, repetitive, less engaging jobs, and can devote time to more value added and interesting tasks. This helps in improving employee morale.

9) Stay ahead: Implementing RPA will help business to stay ahead of competition.

10) Customer satisfaction: Improved customer satisfaction as a result of consistent service levels provided by untiring digital employees.

VII. LIMITATIONS OF RPA

Though all RPA tools provide the flexibility to be programmed to suit the business requirement, and can automate up to 40-50% of the activities in an enterprise[5], they have some limitations:

1) Operating system: Most RPA tools work only on Windows operating system and are not suitable for Mac or Linux.

2) Programming effort: To fulfill complex business requirements, significant effort goes into programming bots and in turn, calls for involvement of technical experts.

3) Process fluctuations: Bots cannot handle any variations in the system. These are highly reliable in a stable process and at the same time behave completely abnormal in case of any process fluctuations. Nevertheless, this can be taken care of by introducing proper warnings and audit provisions.

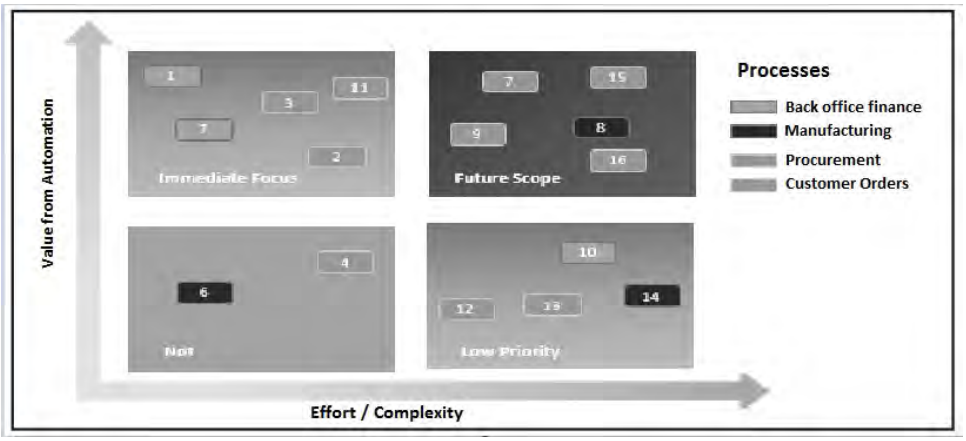

Fig. 4. Process Complexity vs. Value Addition

4) Cost factors: If the existing workforce previously doing the work is still around, then economic efficiency of the system can't improve as the expenses on digital robots would be over and above the existing overheads. The workforce has to be freed up and re-engaged in more value-added areas.

5) Complete automation: A complete automation or end-to-end business automation is not possible through RPA. Most of the studies show that 30-40% of business processes can be addressed by RPA tools.

VIII. AUTOMATION SERVICES IMPLEMENTATION LIFE CYCLE

Robotic Process Automation implementation process can be analogous to any software implementation cycle in an organization. Depending on the complexity and scope, the duration may be of 6-10weeks.

The following are the milestones or phases of a typical RPA implementation project:

A. Pre-implementation Stage

The following activities are part of this phase:

Process standardization and analysis, implementation partner selection, technology platform or tool selection.

This foundational phase is the most important of the whole life-cycle. The success of the project is very much dependent on the solemnity of understanding the business process. Outliers have to be identified and a process has to be setup to handle the same.

B. Implementation Stage

The identified business process is mapped to the automation tool. Testing, validation and, managing defects are the key steps of this phase.

C. Post-implementation Stage

Evaluation and stabilization of the process are key features of this stage. Depending on the success factors, the future roll-outs (scalability) are decided during this phase. This is in fact a very short or nonexistent phase depending upon the process.

Fig. 5 is the diagrammatic representation of implementation cycle.

IX. SUCCESS FACTORS

Many companies have already taken at least a baby step towards automation. We can call it a pre-automation or sub-automation stage. Unless fully unleashed, the impact of automation remains minimal. We have categorized a few factors that determine the success of RPA in an organization.

A. Committed Management

Six Sigma in GE could not have been a super success without Jack Welch's active involvement. No ERP implementation becomes a success story without top management's participation. Similarly, RPA success depends a lot on how committed the management is. In absence of the top-down push, organization will struggle to reap the real benefit of automation.

B. Process Stability

A well-defined, rule-based, stable process is most suitable for RPA implementation. However, no process can guarantee zero fluctuations. Envisaging outliers during the initial stage of implementation is very crucial

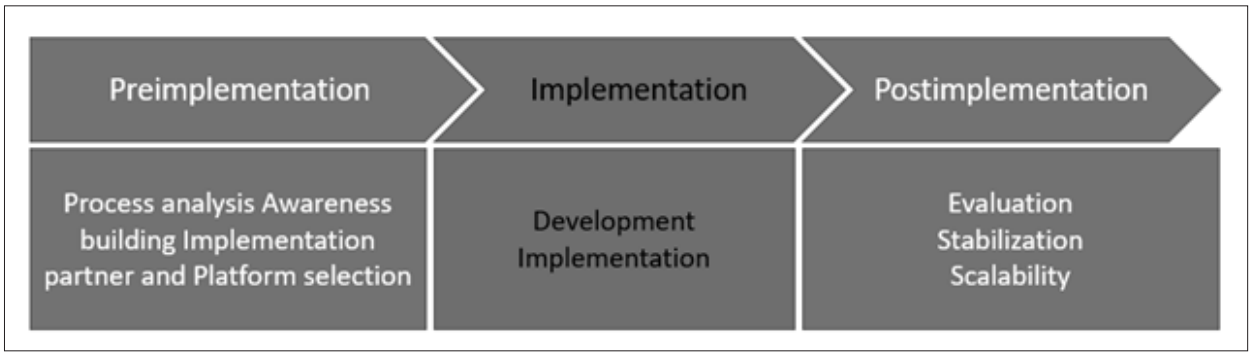

Fig. 5. RPA implementation cycle

to success. If identified beforehand, these events can be taken care of while designing the bots.

C. Dedicated Team

Bots follow the exact steps as demonstrated to them. A dedicated project team consisting of domain and technical expertise is vital towards the accomplishment of the automation goal.

D. Audit System

A well-established digital labour is expected to make zero error. However, there must be an audit system for a periodic review of the system.

E. Human Touch

Automation has always been perceived as a threat to the workforce. A threatened employee resists change. It becomes the responsib ility of the management to ensure that employees do not feel vulnerable and they are better utilized for value-added activities. The aim should be 'job reduction', not 'people reduction'.

F. Center of Excellence

The center of excellence will be an internal group which will help the workforce to train and reskill. It will develop a repository of reusable use cases and can be a knowledge base accessible by the whole organization.

X. IMPACT ON SOCIETY AND ECONOMY

Technology is pushing jobs to two extremes. One end is completely manual jobs and the other end is highly cognitive jobs. Whatever we are doing today did not exist 30 or 40 years ago. Similarly, some of whatever, we are doing today may not exist a few years in the future.

Technologies bring in efficiency. While automation takes away jobs in one field, at the same time it creates jobs in another. It cannot be perceived as a threat to the workforce because this transformation is inevitable.

With more and more automation, less efficient employees will be under pressure, whereas efficient ones will be encouraged to take up more satisfying and engaging tasks.

Education, re-education, learning, and relearning is the need of the hour. Many CEOs and CTOs are heard to be reiterating this slogan.

As per McKinsey research, 30-40% businesses can use RPA technology. RPA will have an economic impact of $ 5-7 trillion by the year 2025 and it will touch 230 million knowledge workers, which is almost 9% of the global workforce. These figures are significant.

RPA is replacing BPO and is bringing back jobs to onshore. If companies don't embrace automation, then they are going to lose the competitive advantage. This is against their traditional economic driver of BPOs, but to remain competitive this is the only way out.

Jobs come and jobs go. One such example can be telephone operators, type writers, stenographers, etc. in 1900 there was no job called a telephone operator and in 2019 there is no such job. So, it is natural, and it should not create any panic. Any employee willing to rescale will be always an asset. Intelligent Quotient (IQ) jobs can go to RPA, Emotional Quotient (EQ) jobs will remain with humans.

XI. RPA FACTS AND FIGURES

As per Forrester, RPA Market will reach $2.9B by 2021 [6].

More than 40% of enterprises will create state-of-the-art digital workers by combining AI with Robotic Process Automation (RPA).

The RPA market will reach $1.7 billion in 2019 and $2.9 billion in 2021.

By the end of 2019, automation will eliminate 20% of all service desk interactions due to a successful combination of cognitive systems, RPA, and various chatbot technologies [7].

XII. CONCLUSION

In industries like manufacturing and supply chain, growth seems to be skewed towards RPA, but potential seems to be with Artificial Intelligence (AI). RPA effectively bridges the gap between ERP system (present) and AI (future). Present day talk is about Big data analysis, Blockchain, Artificial intelligence, Machine Learning, Cognitive Learning etc. but by far Robotic Process Automation seems to be a more realistic and demonstrative technology.

Technologies like Big Data, Blockchain, Artificial intelligence need to cover some distance before they become part of mainstream technology.

Power of RPA is tremendous. As it is said,'Competition is doing it. If you don't embrace, you will be left out'. Companies are realizing it gradually.

Employee morale can be improved by eliminating boredom to a great extent. Increased productivity, less human error, improved customer experience, customer's reflection on the brand are consequential outputs of RPA

when treated appropriately.

Several organizations are realizing the potential of this technology, and it seems to have become a buzz-word which is certainly not going to fizzle. The board-room question is no more about 'IF', but it is more about 'WHEN' to go RPA way of business.

We have experienced trembling hands and a fumbling voice when employees are asked to demonstrate their existing processes to the RPA experts. This is quite natural as there is a misconception that automation will replace human jobs entirely. Top management has a big role to play in rehabilitation of employees with a human touch.

We should always be reminded, 'A business cannot be automated without people'.

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